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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/594,846

11/08/2006

Makoto Iwai

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EXAMINER

RAO, G NAGESH

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,846	<b>Applicant(s)</b> IWAI ET AL.	
	<b>Examiner</b> G. NAGESH RAO	<b>Art Unit</b> 1714	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 1) A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 2 recites the broad recitation 100 to 2000 atm, and the claim also recites in dependence to claim 8's limitation of 300 atms to 2000 atms which is the narrower statement of the range/limitation.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2) Claims 11-12 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Examiner has reviewed the specification and example 2 as cited by applicant in the remarks and found no support (implicit or explicit) that the GaN single crystal is grown at a rate of at least 25 micron/hr. .

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3) Claims 1-4 rejected under 35 U.S.C. 102(e) as being anticipated by Sasaki (US Pg Pub 2006/0051942).

Sasaki 942 pertains to a method of fabricating a Group III Nitride single crystal whereby a Sodium metal flux is utilized, and the nitride crystal is grown in atmosphere comprising a gas mixture of nitrogen gas under a temperature range of 100<sup>0</sup>C to 1500<sup>0</sup>C and a pressure range of 100Pa -200MPa (which falls within the 300-1200 atm range that includes a 120 to 600 atm specifically) (See Abstract, Sections 0026-0032).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4) Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US Pg Pub 2006/0051942) in view of Sarayama (US Pg Pub 2002/0175338).

From the aforementioned rejection Sasaki 942 pertains to a method of fabricating a GaN single crystalline material. However Sasaki 942 fails to disclose an elevating crucible containing said flux until a seed crystal contacts said flux.

In the same field of endeavor pertaining to GaN single crystal growth Sarayama 338 discloses a means of elevating a crucible towards the seed crystal (See Figs 15A and 15B Sections 0151-0164) which as disclosed as a means of effective growth and facilitation of the nitride crystal from a seed base.

It would therefore be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of Sarayama 338 with that of Sasaki 942 in order to facilitate an efficient and high quality means of GaN single crystal growth.

5) Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US Pg Pub 2006/0051942) in view of D'Evelyn (US Pg Pub 2006/0096521).

From the aforementioned rejection Sasaki 942 pertains to a method of fabricating a GaN single crystalline material. However Sasaki 942 fails to disclose using a system for hot isostatic pressing (HIP).

In the same field of endeavor pertaining to GaN single crystal growth, D'Evelyn 529 discloses a means of using HIP which can enable a reduction of crystal defects in the grown crystal (See Abstract, 0009-0010, and 0024-0028).

Thus it would be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of D'Evelyn 529 with that of Sasaki 942 in order to facilitate higher quality and defect-free/reduced crystal structures.

6) Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarayama (US Pg Pub 2002/0175338) in view of Sasaki (US Pg Pub 2006/0051942).

Sarayama 338 discloses a means of elevating a crucible towards the seed crystal (See Figs 15A and 15B Sections 0151-0164) which as disclosed as a means of effective growth and facilitation of the nitride crystal from a seed base. Whereby the flux in the crucible is driven up towards the seed crystal and downward to separate the seed crystal from the flux.

However Sarayama 338 fails to disclose the claimed atm and temp range for processing and fabrication of the GaN single crystal material.

In the same field of endeavor pertaining to GaN single crystal growth, Sasaki 942 pertains to a method of fabricating a Group III Nitride single crystal whereby a Sodium metal flux is utilized, and the nitride crystal is grown in atmosphere comprising a gas mixture of nitrogen gas under a temperature range of



100<sup>0</sup>C to 1500<sup>0</sup>C and a pressure range of 100Pa -200MPa (which falls within the 300-1200 atm range) (See Abstract, Sections 0026-0032).

It would be obvious to one having ordinary skill in the art at the time of the present invention to notate that this limitation is a resultant effective variable limitation and that Sarayama 338 benefits from the incorporated teachings of Sasaki 942 in order to facilitate higher quality growth of GaN single crystalline material.

7) Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarayama (US Pg Pub 2002/0175338) in view of Sasaki (US Pg Pub 2006/0051942) in further view of D'Evelyn (US Pg Pub 2006/0096521).

From the aforementioned hypothetical combination rejection of Sarayama 338 and Sasaki 942 pertains to a method of fabricating a GaN single crystalline material. However the hypothetical combination fails to disclose using a system for hot isostatic pressing (HIP).

In the same field of endeavor pertaining to GaN single crystal growth, D'Evelyn 529 discloses a means of using HIP which can enable a reduction of crystal defects in the grown crystal (See Abstract, 0009-0010, and 0024-0028).

Thus it would be obvious to one having ordinary skill in the art at the time of the present invention to incorporate the teachings of D'Evelyn 529 with that of Sarayama 338 and Sasaki 942 in order to facilitate higher quality and defect-free/reduced crystal structures.

8) Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US Pg Pub 2006/0051942) in view of Kitaoka (US Pg Pub 2004/0144300).

From the aforementioned rejection Sasaki 942 pertains to a method of fabricating a Group III Nitride single.

However Sasaki 942 fails to disclose the limitation of the growth rate to be at least 25 micron/hr.

In the same field of endeavor, Kitaoka 300 pertains to GaN crystal growth fabrication whereby it does disclose typical growth rate parameters being 20 micron/hour or more (See Section 0038).

Thus it would be obvious to one having ordinary skill in the art at the time of the present invention it would have been obvious to incorporate the growth rate parameter teachings of Kitaoka 300 with that of Sasaki 942 in order to facilitate efficient, rapid, and bulk growth conditions of GaN single crystalline material.

9) Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sarayama (US Pg Pub 2002/0175338) in view of Sasaki (US Pg Pub 2006/0051942) in further view of Kitaoka (US Pg Pub 2004/0144300).

From the aforementioned hypothetical rejection of Sarayama 338 and Sasaki 942 pertains to a method of fabricating a Group III Nitride single.

However the combination fails to disclose the limitation of the growth rate to be at least 25 micron/hr.

In the same field of endeavor, Kitaoka 300 pertains to GaN crystal growth fabrication whereby it does disclose typical growth rate parameters being 20 micron/hour or more (See Section 0038).

Thus it would be obvious to one having ordinary skill in the art at the time of the present invention it would have been obvious to incorporate the growth rate parameter teachings of Kitaoka 300 with that of Sarayama 338 and Sasaki 942 in order to facilitate efficient, rapid, and bulk growth conditions of GaN single crystalline material.

### ***Response to Arguments***

10) Applicant's arguments filed 6/22/10 have been fully considered but they are not persuasive. Upon review of the filed affidavit it is clear that the views

presented are an opinion and do not disclose any rationale as to why the applied art would not be conventionally understood to be applicable in the state of GaN growth processing.

Furthermore the amended claims actually broaden rather than narrow the limitations, thus from a broadest interpretation standpoint Sasaki 942 actually reads on the claimed invention, since the limitations regarding partial pressure delineation has been removed and the atmosphere can solely be a nitrogen gas atmosphere whereby the conditions for pressure and temperature are disclosed by the reference and read on the claimed invention.

Finally the addition of claims 11-12 have no support in the specification, and examiner has also treated the claims, applying the Kitaoka 300 reference which discloses typical growth parameter conditions that include at least 25 micron/hr, and rationale as to why that growth parameter would be beneficial.

### ***Conclusion***

11) Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to G. NAGESH RAO whose telephone number is (571)272-2946. The examiner can normally be reached on 8:30AM-5PM (INDEPENDENT FLEX SCHEDULE).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael KORNAKOV can be reached on (571)272-1303.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. Nagesh Rao/  
GAU-1714  
Patent Examiner

/Robert M Kunemund/

Primary Examiner, Art Unit 1714

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